

Name: Solutions

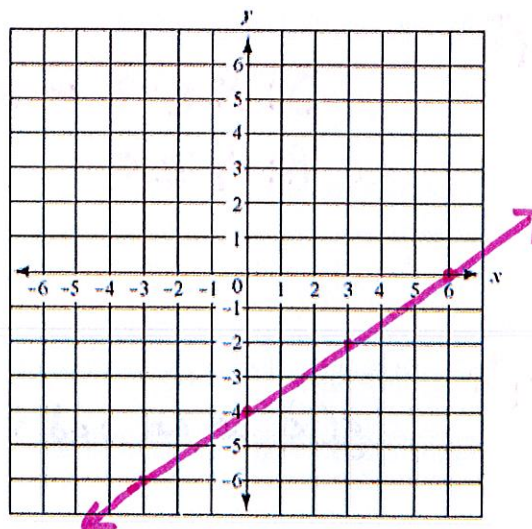
66 Total Points  
 $\bar{x} = 50.5$

Directions: Try each problem without your calculator, then use your calculator ONLY if you feel you have truly tried everything possible without your calculator.

- 4 pts 1. Line A has equation  $y + 10 = \frac{-1}{4}(x - 11)$ . Line B contains the point  $(-2, 3)$  and is perpendicular to line A. Determine an equation for line B in any form.

$$m = 4 \quad y - 3 = 4(x + 2)$$

- 4 pts 2. Graph  $-2x + 3y = -12$  (plot several points and draw your line neatly)



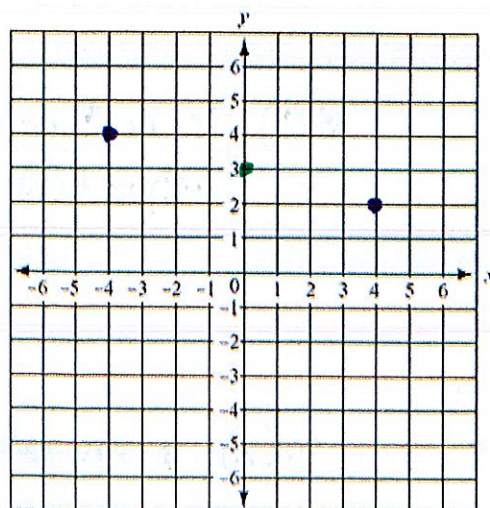
- 4 pts 3. A line contains the points plotted below. Write an equation of the line in point-slope form, slope-intercept form, and general form (standard form).

$$m = \frac{-2}{8} = -\frac{1}{4}$$

$$(4, 2) \quad y - 2 = -\frac{1}{4}(x - 4)$$

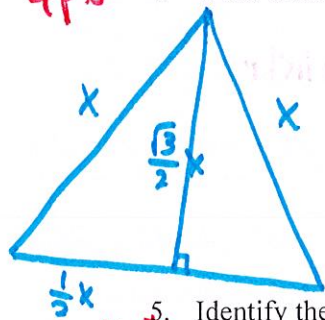
$$y = -\frac{1}{4}x + 3$$

$$x + 4y = 12$$



4pts

4. Write a formula for the AREA of an equilateral triangle as a function of its side length,  $x$ .



$$A(x) = \frac{1}{2}x \cdot \frac{\sqrt{3}}{2}x = \frac{\sqrt{3}}{4}x^2$$

4pts

5. Identify the domain and range of the function  $g(x) = \sqrt{4-x} + 1$ .

$$\begin{aligned} 4-x &\geq 0 \\ -x &\geq -4 \\ x &\leq 4 \end{aligned}$$

$$\begin{aligned} D: x &\leq 4 \\ R: y &\geq 1 \end{aligned}$$

4pts

6. Identify the domain and range of the function  $k(x) = \sqrt{x^2-4}$ .

$$D: x \leq -2 \text{ or } x \geq 2$$

$$R: y \geq 0$$

4pts

7. Determine whether the function  $g(x) = x^{\frac{1}{3}}$  is even, odd, or neither.

$$g(x) \text{ is an odd function because } f(-x) = -f(x)$$

4pts

8. Determine whether the function  $k(x) = x^2 - 3x$  is even, odd, or neither.

$$k(x) \text{ is neither even nor odd because } f(-x) \neq f(x) \text{ and } f(-x) \neq -f(x)$$

4pts

9. Determine whether the function  $m(x) = |x|$  is even, odd, or neither.

$$m(x) \text{ is an even because } f(x) = f(-x)$$

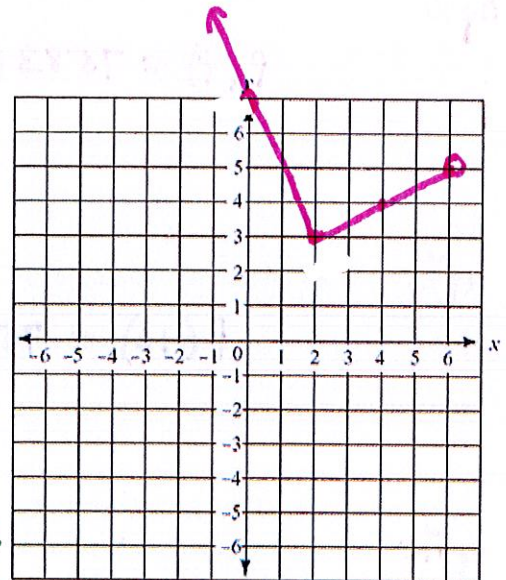
10. Given the piecewise function  $f(x) = \begin{cases} -2x+7 & \text{if } x < 2 \\ \frac{1}{2}x+2 & \text{if } 2 \leq x < 6 \end{cases}$ , determine the following:

4pts a. A graph the function

2pts b. The value of  $f(3) = 3.5$

2pts c. If the function is continuous at  $x = 2$   
yes the function is continuous  
at  $x = 2$  since  $-2(2)+7 = \frac{1}{2}(2)+2$

2pts d. The domain of the function  
 $(-\infty, 6)$



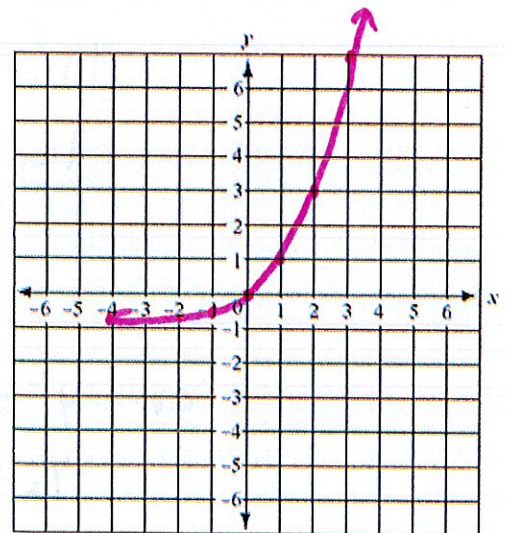
11. Given the exponential function  $f(x) = 2^x - 1$ :

2pts a. Draw a fairly neat and accurate graph of the function.

2pts b. State the domain and range of the function.  
 $D: (-\infty, \infty)$   $R: (-1, \infty)$

2pts c. Determine and equation of any asymptotes of the function.  
H.A.  $y = -1$

2pts d. Determine the zero or root of the function.  
 $x = 0$





12. The population of Sunshine Gap in the year 1910 was 7583. Assume the population increased at a rate of 3.5% per year.

4pts

- a. Write a function for the population growth as a function of time in years.

$$P(t) = 7583(1 + 0.035)^t$$

4pts

- b. Estimate the population in 1920.

$$P(10) = 7583(1.035)^{10} \approx 10,697$$

4pts

- c. Approximate the year when the population reached 30,000.

$$30,000 = 7583(1.035)^t$$

$$3.956217856 \approx (1.035)^t$$

$$\ln(3.956217856) \approx \ln(1.035)^t$$

$$\ln(3.956217856) \approx t \ln(1.035)$$

$$\frac{\ln(3.956217856)}{\ln(1.035)} \approx t$$

$$40 \approx t$$

years

or  $y_1 = 30,000$

$$y_2 = 7583(1.035)^x$$

use the "intersection" utility to find the answer